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Lyme isn't the only tick-borne illness; Researchers find new bacterium

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Patients who test negative for Lyme disease after a suspected tick bite could be suffering from a recently identified illness also spread by deer ticks, a team led by Massachusetts researchers reported Monday.

The paper describes two patients, one in Massachusetts and one in New Jersey, who were initially suspected of having another tick-borne disease but were instead found to have the new infection.

Published in the *Annals of Internal Medicine*, the findings underscore the increasing importance for doctors to think about more than Lyme, the region's most common tick-borne disease, when they see a patient who was or could have been bitten by a tick. The authors said the cases also may give a hint about why some patients who test negative for Lyme become sick with similar symptoms.

The new infection, caused by the bacterium *Borrelia miyamotoi*, is the fifth human disease known to be spread by blood-sucking deer ticks, which transmit disease largely in the spring and summer.

"The big message is everyone who gets tested for Lyme disease should get [tested] for all five," said Sam R. Telford III, a professor at Tufts Cummings School of Veterinary Medicine who studies tick-borne diseases and is one of the authors.

Telford said there are many unknowns about the disease, which he is calling *B. miyamotoi* disease, or BMD, including whether it can be a chronic infection. In all reported cases thus far, patients made a full recovery after being treated with antibiotics. The illness causes severe flu-like symptoms, and in at least one previously reported case in an elderly woman, caused confusion, weight loss, hearing problems, and a wobbly gait.

Researchers from Yale University, Tufts, and other institutions announced the first known US cases in January. The bacterium was known to exist in deer ticks for about a decade, but it was not believed to cause human illness until researchers last year linked it to 46 sick people in Russia, some with relapsing fevers.

Researchers now estimate that 1 percent of the population in areas where Lyme disease is widespread, such as Western Massachusetts and Cape Cod and the Islands, may have been exposed to the new bacterium, which can be transmitted by the tick when it is as small as a poppy seed. Lyme disease is thought to be 7 to 10 times more prevalent in these areas. It is unclear how many people who are exposed to the newly identified bacterium get sick.

The paper examined a 61-year-old man from Massachusetts' South Coast and an 87-year-old from New Jersey. The 61-year-old went to Dr. Hanumara Ram Chowdri in New Bedford last August with an acute-onset fever, shaking chills, worsening headache, loss of appetite, and chest pain, among other symptoms. He was admitted to the hospital and did not recall having been bitten by a tick. Doctors believed he had anaplasmosis, another tick-borne bacterial disease, and began treating him with intravenous antibiotics. He eventually got better, yet not as fast as doctors would have expected if he had anaplasmosis. The New Jersey patient was also thought to have anaplasmosis.

Both patients' blood was sent to Imugen Inc., a Norwood research and diagnostic lab that conducts testing for tick-borne diseases. It did not show anaplasmosis.

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The physicians "were very surprised the patients did not have anaplasmosis; their clinical presentation seemed unequivocal," said Victor P. Berardi, chief executive and senior scientist at Imugen and an author on the paper. His lab found the bacterium; Telford's lab confirmed the diagnosis.

Peter Krause, senior research scientist at the Yale School of Public Health and School of Medicine who studies the organism, said the bacterium is a distant cousin to the Lyme bacterium. But unlike Lyme, the borrelia can cause a relapsing fever, meaning someone can get a fever, recover, and get it again if not treated. The bacterium is also different from Lyme in that adult females can pass the pathogen to the next generation. Deer ticks are always born uninfected with Lyme and get it from an animal host.

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